

Package: mdscore (via r-universe)

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Type Package

Title Improved Score Tests for Generalized Linear Models

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Suggests Sleuth3

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Description A set of functions to obtain modified score test for generalized linear models.

License GPL (>= 2)

LazyLoad yes

LazyData yes

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`lr.test`*Likelihood ratio test for generalized linear models*

Description

Computes the likelihood ratio test for the coefficients of a generalized linear model.

Usage

```
lr.test(fit1, fit2)
```

Arguments

| | |
|-------------------|--|
| <code>fit1</code> | an object that stores the results of <code>glm</code> fit of the model under the null hypothesis. |
| <code>fit2</code> | an object that stores the results of <code>glm</code> fit of the model under the alternative hypothesis. |

Details

The objects `fit1` and `fit2` are obtained using the usual options passed to the `glm` function.

Value

The function `lrt.test()` returns the following list of values:

| | |
|--------|--|
| LR | the value of the likelihood ratio statistic. |
| pvalue | the p value of test under null hypothesis chi-square distribution. |

Note

Both `fit1` and `fit2` must have the same family and link function.

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References

McCullagh P, Nelder J (1989). *Generalized Linear Models*. Chapman & Hall/CRC, London.
Da Silva DN, Cordeiro GM (2009). "A Computer Program to Improve LR Tests for Generalized Linear Models." *Communications in Statistics – Simulation and Computation*, 38(10), 2184–2197.

See Also

[mdscore](#)
[wald.test](#)

Examples

```
data(strength)
fitf <- glm(y ~ cut * lot, data = strength, family = inverse.gaussian("inverse"))
fit0 <- glm(y ~ cut + lot, data = strength, family = inverse.gaussian("inverse"))
lr.test(fit0, fitf)
```

mdscore

Modified score test for generalized linear models

Description

Computes the modified score test based for the coefficients of a generalized linear model.

Usage

```
mdscore(model = model, X1 = X1, phi = NULL)
```

Arguments

| | |
|-------|---|
| model | an object that stores the results of glm fit of the model under the null hypothesis. |
| X1 | the matrix with the columns of the model matrix X that correspond to the coefficients being specified in the null hypothesis. |
| phi | the precision parameter. |

Details

The object `fit.model` is obtained using the usual options passed to the `glm` function.

Value

The function `mdscore()` returns the following list of values:

| | |
|-------|---|
| Sr | the value of the score statistic. |
| Srcor | the value of the modified score statistic. |
| coef | a vector with the coefficients A1 , A2 and A3. |
| n | the total sample size. |
| df | the number of degrees of freedom of the chi-squared approximations for the tests. |
| phi | the precision parameter used in the computations |

Author(s)

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References

- Cordeiro GM, Ferrari SLP (1991). A Modified Score Test Statistic Having chi-squared Distribution to Order $n-1$. *Biometrika*, 78(3), 573–582.
- Cordeiro GM, Ferrari SLP, Paula GA (1993). Improved Score Tests for Generalized Linear Models. *Journal of the Royal Statistical Society B*, 55(3), 661–674.
- Cribari-Neto F, Ferrari SLP (1995). Second Order Asymptotics for Score Tests in Generalised Linear Models. *Biometrika*, 82(2), 426–432.
- da Silva-Junior AHM, da Silva DN, Ferrari SLP (2014). mdscore: An R Package to Compute Improved Score Tests in Generalized Linear Models. *Journal of Statistical Software*, 61(2), 1-16., <http://www.jstatsoft.org/v61/c02/>

See Also

[summary.mdscore](#)

Examples

```
data(strength)
fitf <- glm(y ~ cut * lot, data = strength, family = inverse.gaussian("inverse"))
summary(fitf)
X <- model.matrix(fitf, data = strength)
fit0 <- glm(y ~ cut + lot, data = strength, family = inverse.gaussian("inverse"))
mdscore(fit0, X1=X[, 7:10])
```

strength

Impact Strength an Insulating Material

Description

The dataset is a subsample of the 5 x 2 factorial experiment given by Ostle and Mensing (1963).

Usage

```
data(strength)
```

Format

A data frame with 30 observations on the following 3 variables.

cut type of specimen cut.

lot lot of the material – I, II, III, IV and V.

y observations of the impact strength.

Source

Ostle B, Mensing RW (1963). *Statistics in Research: Basic Concepts and Techniques for Research Workers*. Iowa State University.

Examples

```

data(strength)
fitf <- glm(y ~ cut * lot, data = strength, family = inverse.gaussian("inverse"))
summary(fitf)
X <- model.matrix(fitf, data = strength)
fit0 <- glm(y ~ cut + lot, data = strength, family = inverse.gaussian("inverse"))
test <- mdscore(fit0, X1=X[, 7:10])
summary(test)

```

summary.mdscore

*Summary methods for mdscore objects***Description**

summary methods for the mdscore objects

Usage

```

## S3 method for class 'mdscore'
summary(object, ...)

```

Arguments

| | |
|--------|--|
| object | object resulting from a run of the mdscore function. |
| ... | not currently used |

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References

da Silva-Junior AHM, da Silva DN, Ferrari SLP (2014). mdscore: An R Package to Compute Improved Score Tests in Generalized Linear Models. *Journal of Statistical Software*, 61(2), 1-16., <http://www.jstatsoft.org/v61/c02/>

See Also

[mdscore](#)

Examples

```

library(Sleuth3)
d <- transform(case1102, TLrat = Brain/Liver, Ltime = log(Time),
               Lwrat = log((Weight + Loss)/Weight),
               Treat = factor(Treatment == "BD",
                              labels=c("NS", "BD"))
               )

```

```

fitf <- glm(TLrat ~ Ltime * Treat + Days + Sex + Lwrat
           + Tumor + Treat*Lwrat, data = d,
           family = Gamma("log")
           )
X <- model.matrix(fitf)
fit0 <- glm(TLrat ~ Ltime * Treat + Sex + Lwrat + Tumor + Days,
           data=d, family=Gamma("log"))
test <- mdscore(fit0, X1=X[,9], phi=NULL)
summary(test)

```

wald.test

Wald test for generalized linear models

Description

Computes the Wald score test for the coefficients of a generalized linear model.

Usage

```
wald.test(model = model, terms)
```

Arguments

| | |
|-------|--|
| model | an object that stores the results of glm fit of the model under the null hypothesis. |
| terms | number of coefficients to be tested under null hypothesis |

Details

The object `model` is obtained using the usual options passed to the `glm` function.

Value

The function `wald.test()` returns the following list of values:

| | |
|--------|--|
| W | the value of the Wald statistic. |
| pvalue | the p value of test under null hypothesis chi-square distribution. |

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References

McCullagh P, Nelder J (1989). *Generalized Linear Models*. Chapman & Hall/CRC, London.

See Also

[lr.test](#)

[mdscore](#)

Examples

```
data(strength)
fitf <- glm(y ~ cut * lot, data = strength, family = inverse.gaussian("inverse"))
wald.test(fitf, term=9)
```

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